

# Research on the Integrated System Construction of Green Agriculture Products Supply Chain

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## Abstract

According to the basic ideas of green agriculture products supply chain, this paper designed the basic framework of its integrated system, this including five subsystems as logistics system, organization system, trace system, safety monitoring system and policy system. Analyse through the five subsystems' basic operation mechanism, concluded that to build integrated system of green agriculture products supply chain in China is strategic choice, it can make agricultural efficiency, increase farmers' income and promote agricultural and rural sustainable development.

## Keywords

*Supply Chain; Green Agriculture Products; Integrated System; Construction*

## Introduction

With the rapid development of global economy, the shortage of resources and environmental pollution problems have become increasingly prominent, people pay more and more attention to the green and environmental protection. However, in recent years, a variety of food safety problems, to a certain extent reflect the vulnerability of Chinese agricultural supply chain. With new and high science and technology to construct modern green supply chain of agriculture products, is the important way to promote our agricultural production technology and management level, improve our country agriculture products quality level, to meet the green logistics and green consumer demand, enhance the competitiveness of agriculture products and agricultural sustainable development.

## Basic Ideas of Green Agriculture Products Supply Chain

Green Supply Chain (GSC) was first proposed by

Manufacturing Research Association from Michigan State University in 1996, also known as Environmentally Conscious Supply Chain (ECSC), is one of the modern management models in the comprehensive consideration of environmental impact and resource efficiency throughout the supply chain.

Green Agriculture Products Supply Chain (GAPSC) makes the concept of "green, health and environmental protection" throughout the agriculture products supply chain, in the product life cycle process from agriculture products design, production, packaging, warehousing, transportation, consumption and waste recycling processing, through green design, green material, green production, green manufacturing, green logistics, green marketing and green recycling and other technical means, produce high yield, high quality, efficient green agriculture products, and advocate green consumption, to ensure quality and safety of agriculture products. The green agriculture products supply chain management can be divided into green purchasing, green production, green manufacturing, green logistics, green marketing, green consumption, and green recycling. All links are connected into a whole. Green agriculture products supply chain management is not the separate management, and should take the whole supply chain of agriculture products as a system to strictly control. Any part appears problem, which is difficult to ensure the security of food consumption.

## The Integrated System Construction of Green Agriculture Products Supply Chain

The basic framework of green agriculture products supply chain integrated system is shown in figure 1.

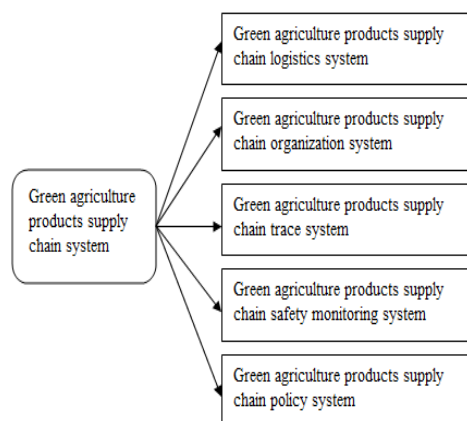


FIG.1 GREEN AGRICULTURE PRODUCTS SUPPLY CHAIN SYSTEM

### 1) Green Agriculture Products Supply Chain Logistics System

The construction of green agriculture products supply chain logistics system is to solve the contradictions between supply and marketing of agriculture products, improve the agricultural competitiveness, reduce produce cost, and disperse the risk of agriculture products.

Agriculture products supply chain in developed countries is the earliest supply chain model in the logistics industry, but in our country is still at the primary stage of construction. China's traditional agriculture products supply chain structure is shown in Figure 2.

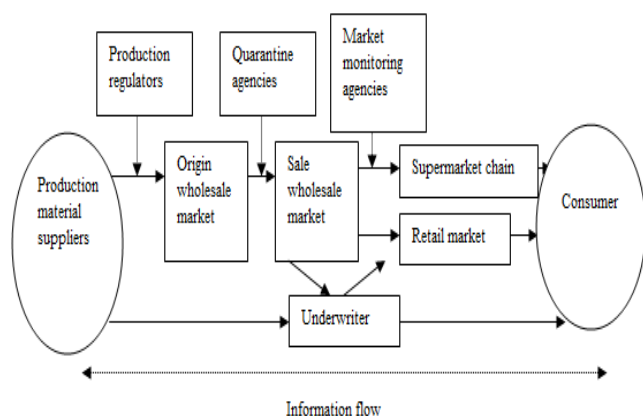


FIG.2 TRADITIONAL AGRICULTURE PRODUCTS SUPPLY CHAIN STRUCTURE

For the green agriculture products, at present, China's regional and national green agriculture products logistics system has not yet been formed, green agriculture products circulation is still too dependent on traditional marketing channels. As the common produce, a large number of green

agriculture products sold through the farmers market and multi-level wholesale market, not only the logistics efficiency is low, product loss is big, but there is not ensure the "green" features in the process of the circulation of agriculture products, which cannot satisfy the demand of green agriculture products logistics.

Therefore, in order to promote green agriculture products industry health development, we must establish a unique green agriculture products proprietary supply chain to ensure the quality and safety, and to reduce the logistics cost.

On the basis of analysis and comparison, the paper proposed the modern closed supply chain model of green agriculture products based on the logistics center (as shown in Figure 3).

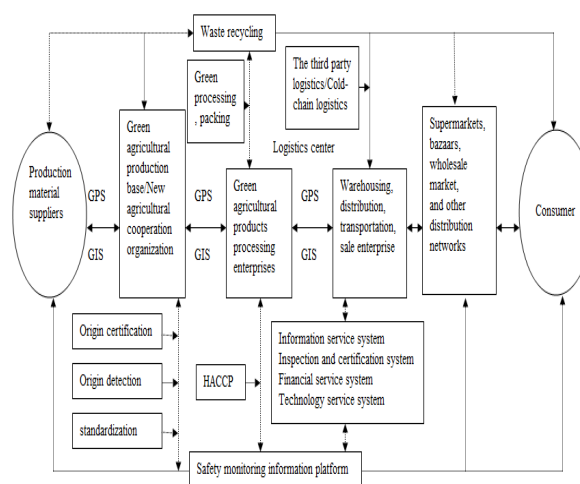


FIG.3 CLOSED SUPPLY CHAIN MODEL OF GREEN AGRICULTURE PRODUCTS BASED ON THE LOGISTICS CENTER

In the whole supply chain, closed supply chain of green agriculture products consider the environmental impact, resource efficiency and other factors, based on supply chain management technology, through the management about the network of agriculture products suppliers, manufacturers, distributors and users, take the green management awareness throughout the whole life cycle including product design, manufacturing, packaging, transport, use and disposal of the product; through green design, green material, green technology, green production, green packaging and green recycling technology, produce the green products, in order to achieve common profit in enterprises and reduce the negative impact on the environment, enhance core competitiveness. On the one hand, closed supply

chain management can improve reaction speed of agricultural production and market, reduce transaction costs, reduce inventory, shorten the production cycle, improve service levels, improve product quality, increase product sales profit, meet customer requirements and needs of the society to the maximum extent; on the other hand, can also ensure the green agriculture products quality safety, ecological environment safety and biological resources safety, improve the agricultural enterprises comprehensive economic benefits.

## 2) Green Agriculture Products Supply Chain Organization System

Generally speaking, the organization system of green agricultural product supply chain can be divided into three basic types: the agriculture products association model of organization system, the leading agriculture enterprise model of organization system and the chain supermarket model of organization system.

### The Agriculture Products Association Model of Organization System

The agriculture products association is a folk, non-profit social group formed by legal persons, other organizations or citizens on the basis of agriculture products production, processing, circulation. Its most obvious advantages is to improve the institutionalization of the agriculture products logistics, to avoid the high transaction costs by single farmer participation, and improve the efficiency of scale economy. In this model, the main features about green agriculture products supply chain organization system is that agriculture products associations dominate the whole supply chain, integrate the all logistics activities and then convey to the integrated logistics business ( as shown in Figure 4 ):

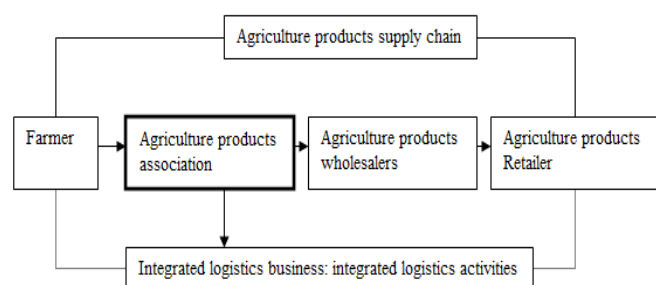


FIG.4 THE AGRICULTURE PRODUCTS ASSOCIATION MODEL OF ORGANIZATION SYSTEM

### The Leading Agriculture Enterprise Model of Organization System

The leading agriculture enterprise connected to the production and consumption field, by the third party logistics company it responsible for agriculture products logistics activities, which belongs to the "farmer + leading enterprise + market" of agricultural industrialization organization mode. Its most obvious advantages is reflected by high added value agricultural products, high degree of the third party logistics and high level of informatization. In this model, the main features about green agriculture products supply chain organization system is that leading agriculture enterprises dominate the whole supply chain, integrate the all logistics information and then convey to the integrated logistics business ( as shown in Figure 5 ):

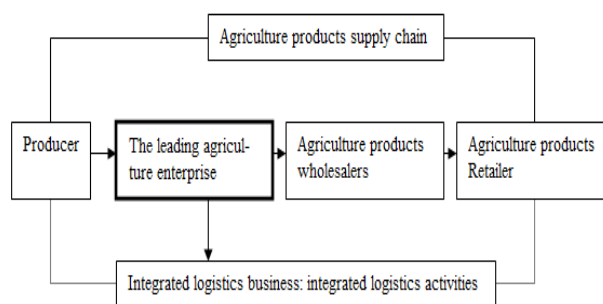


FIG.5 THE LEADING AGRICULTURE ENTERPRISE MODEL OF ORGANIZATION SYSTEM

### The Chain Supermarket Model of Organization System

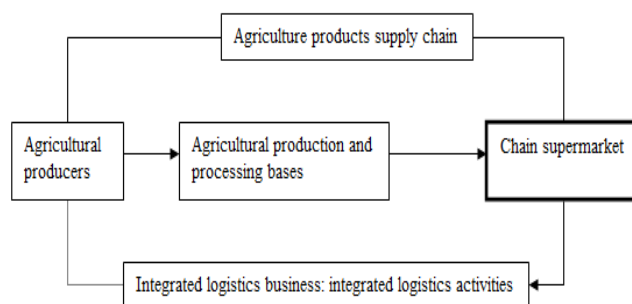


FIG.6 THE CHAIN SUPERMARKET MODEL OF ORGANIZATION SYSTEM

The chain supermarket model refers to that as the main channel of agriculture products retail terminal, chain supermarket dominate agriculture products logistics, which belongs to the "farmers +

base + retail terminal "of agricultural industrialization organization mode. In this model, agriculture products supply chain belongs to the typical pull-based supply chain, and the chain supermarket dominate the whole supply chain, integrate the all logistics information and then convey to the integrated logistics business ( as shown in Figure 6 ):

### 3) Green Agriculture Products Supply Chain Trace System

The trace system is a kind of the security guarantee system based on risk management. Once the occurrence of health problems, in accordance with each link of information that must be recorded from raw materials to finished products, this system can trace the flow of food, recycle harm food that has not yet been consumed, cancel its marketing authorization, cut off the source, eliminate the hazards and reduce the loss. (as shown in Figure 7)

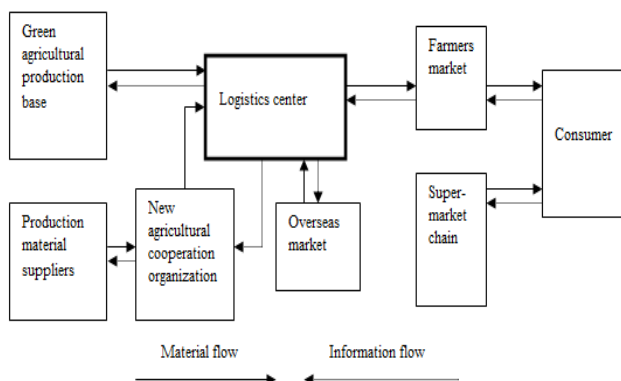


FIG.7 THE AGRICULTURE PRODUCTS SUPPLY CHAIN MODEL BASED ON TRACE SYSTEM

Green agriculture products supply chain trace system includes the construction of trace system, operation mode and the research of key technology in information system. In accordance with the principle of each link can be traced from production to sales, it builds production and sales record system; realize the agriculture products quality safety traceability. The construction of green agriculture products supply chain trace system, not only can restore the trust of agriculture products, promote the agriculture products safety, improve economic efficiency, promote the export of agriculture products, but also establish the agricultural basic database and information network as the basis and means for forecast and decision. For consumers, reduce foodborne disease. To the enterprises, because the product is

unqualified, expiration period shorten, forcing companies frequently to reclaim its product, greatly enhance the enterprise's production costs, help to reduce the total cost of production enterprise and business risk. To the government, the improvement of product quality, help to improve public health, reduce the public health expenditure; The product recall can reduce public disease incidence, disease transmission and government public health expenditure.

### 4) Green Agriculture Products Supply Chain Safety Monitoring System

The green agriculture products supply chain safety monitoring system include the agriculture products quality safety and monitoring mechanisms, laws, standards, certification, technology and other elements, which protect agriculture products and food safety, implement the information collection, record, transmission management. In order to ensure the effective implementation of the agriculture products trace system, we must strengthen the effective control in agriculture products circulation. The first is macro control from the macro level and government level. The second is micro control from the micro level and internal technical level: at the macro level, the government must set the regulators, the laws ,the formulation and relevant standards, using the related system to compensate for the asymmetric information, improve agriculture products safety management regulations system, strengthen safety supervision and law enforcement, improve the quality of safety standards, develop agriculture products certification , market admittance system and credit system, build agriculture products safety credence environment, make agriculture products safety credit culture; at the micro level, establish operating standards, strictly implement market access system, build brand system, promote advanced detection and quarantine method ,implement products recall system, and strengthen the system data audit in order to ensure that the information is true and effective.

### 5) Green Agriculture Products Supply Chain Policy System

The green agriculture products supply chain policy system is to combine with the development characteristic of the logistics industry, straighten out the logical sequence of agriculture products supply chain policy system construction, and

establish agriculture products logistics policy system to adapt to the market economy system, so as to enhance the ability of integrated adjusting control. The green agriculture products supply chain policy system includes macro, medium and micro three levels. At the macro level, the government promulgated the policies and legal platform related to agriculture, which is to grasp the green agriculture products supply chain developmental direction and environment. At the medium level, the government and its related industries enact all related logistics policies and legal platform, which ensure the establishment of agriculture products logistics standardization system. At the micro level, the state and relevant departments of the agriculture formulate relevant regulations and guidance about agricultural logistics system, which is a policy and law platform to guide the green agriculture products supply chain how to carry out specific operations.

## Conclusions

The basic framework of green agriculture products supply chain integrated system includes five subsystems as logistics system, organization system, trace system, safety monitoring system and policy system. The logistics system analyse the function and basic conditions in green agriculture products supply chain, operation model and management mechanism, etc; the organization system analyse the leading institutions, method and organization pattern, etc; the trace system analyse the construction of trace system, operation model and key technology in trace management information system structure, etc; the safety monitoring system analyse the real-time monitoring to the supply chain enterprises and dynamic trace management mechanism; the policy system analyse the related laws and regulations guarantee system and exit mechanism, etc.

The integrated system construction of green agriculture products supply chain is to improve China's agriculture products competitiveness in the international market, break the foreign agriculture products export green barriers, and participate competition in international market. At the same time, the operation of green agriculture products supply chain reduce the decay and costs in the process of agriculture products logistics, therefore, the construction of green agriculture products supply chain integrated system in China is strategic choice, it can make agricultural efficiency, increase farmers' income and promote agricultural and rural sustainable development.

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